



This is Revision A version of the CSSE PLSS baseline as of
1/23/08.

All schematic details are subject to change as trade studies
and other optimization activities are completed in the future.



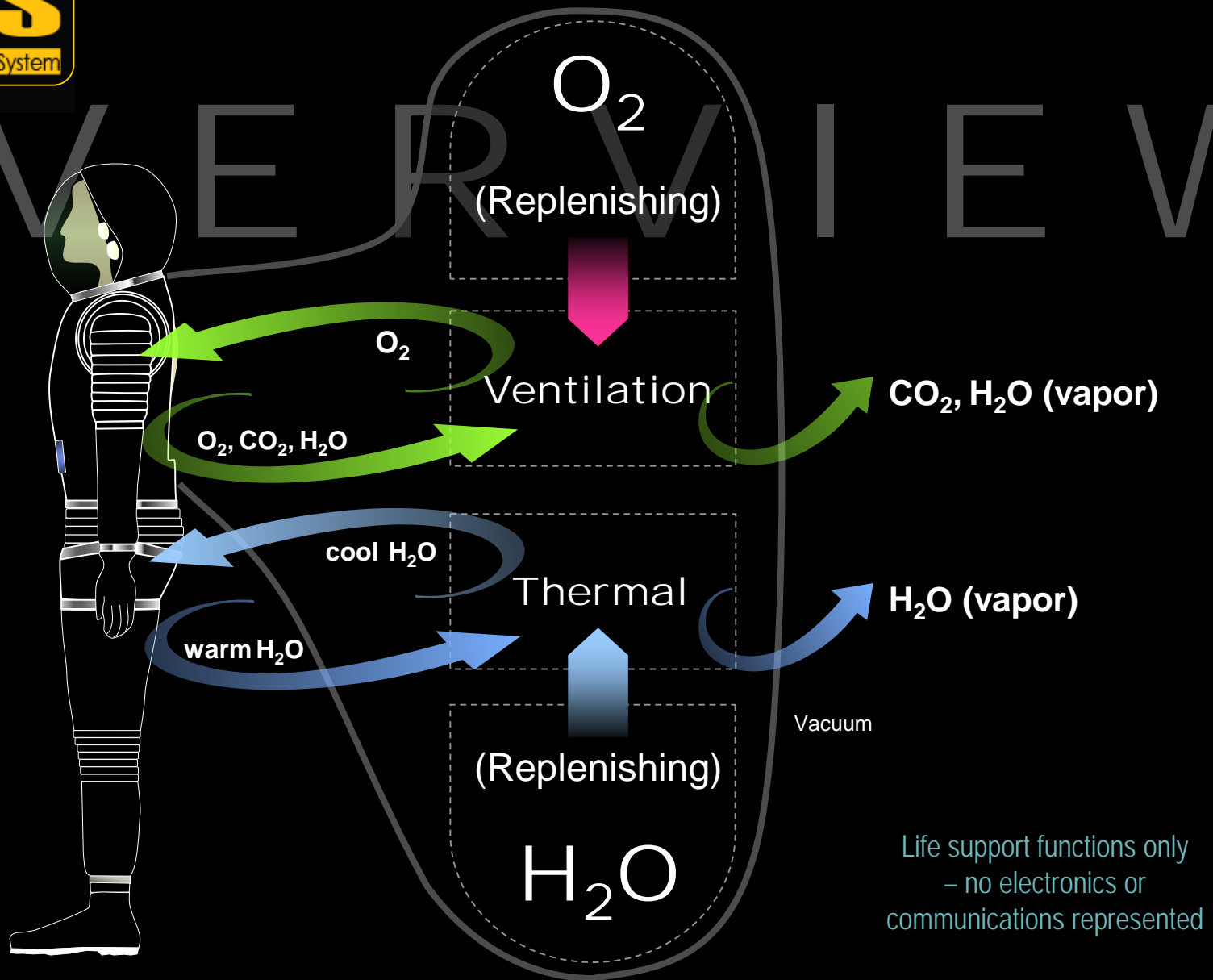
Introduction to the Portable Life Support Schematic and Technology Development Components

Schematic, Functional Flow Modes, RCA, SWME, CO2 Sensor

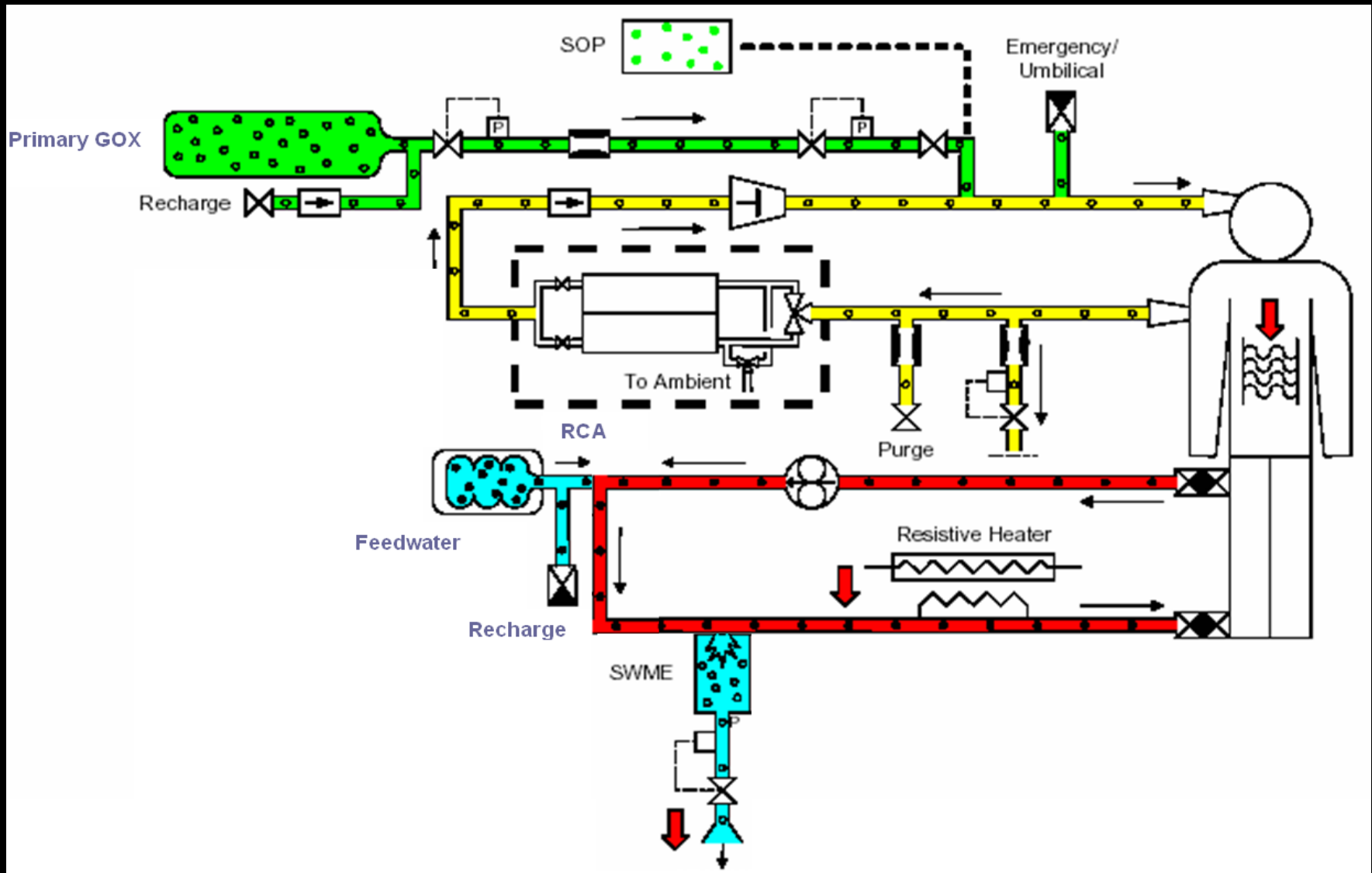


Please verify this is the most current version.

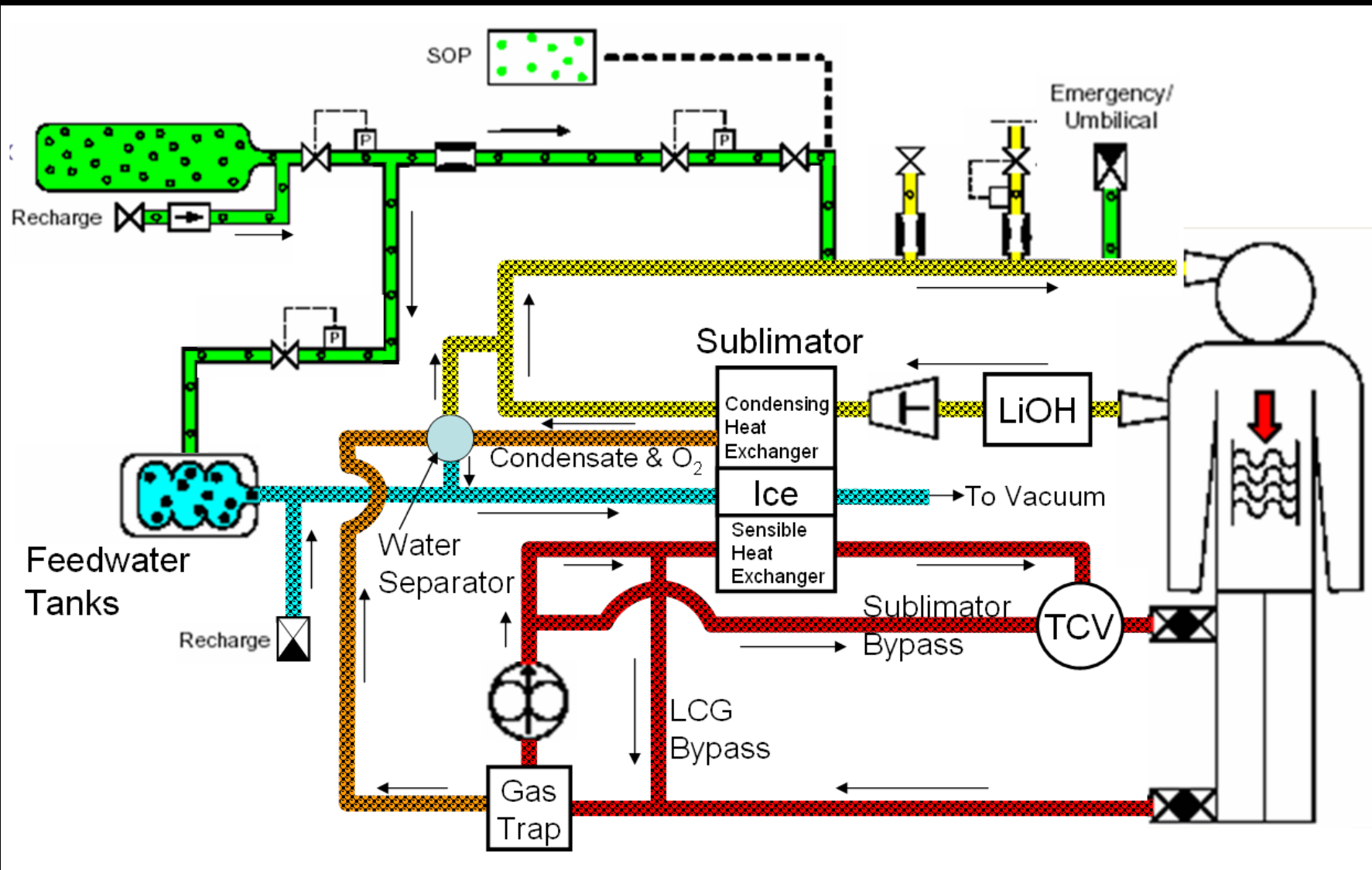
OVERVIEW



High Level CxP PLSS Schematic



High Level STS/ISS PLSS Schematic



Comparison to ISS/Shuttle EMU

	Shuttle/ISS EMU	CxP EMU
Thermal Control	Sublimator cools LCG water/vent loop - requires ambient pressures lower than H2O triple point pressure. Uses de-ionized water	SWME evaporates water at ambient pressures lower than vapor pressure of LCG water (significantly higher than H2O triple point) – should be able to use standard potable water
Feedwater	Includes 15 psig oxygen regulator to provide backpressure for feedwater tanks	Uses suit pressure to provide tank backpressure (eliminates regulator)
CO2 Control	LiOH canister replaced after each EVA - Metox needs to be regenerated after each EVA (power & crew time hit) Both technologies increase thermal load on PLSS thermal control unit	RCA vents CO2 and H2O from vent loop to ambient vacuum Fully regenerable during operation – no time limit for EVAs Dual beds transfer heat back and forth – practically no cooling required No routine maintenance
Heat Exchanger	Condensing heat exchanger	Non condensing heat exchanger (RCA) removes humidity (eliminates water separator) Humidifier may be required

Oxygen

- ☒ Nominal
- ☒ Recharge
- ☒ Umbilical
- ☒ Emergency
- ☒ Buddy

Ventilation

- ☒ Nominal
- ☒ Recharge
- ☒ Umbilical
- ☒ Emergency
- ☒ Buddy

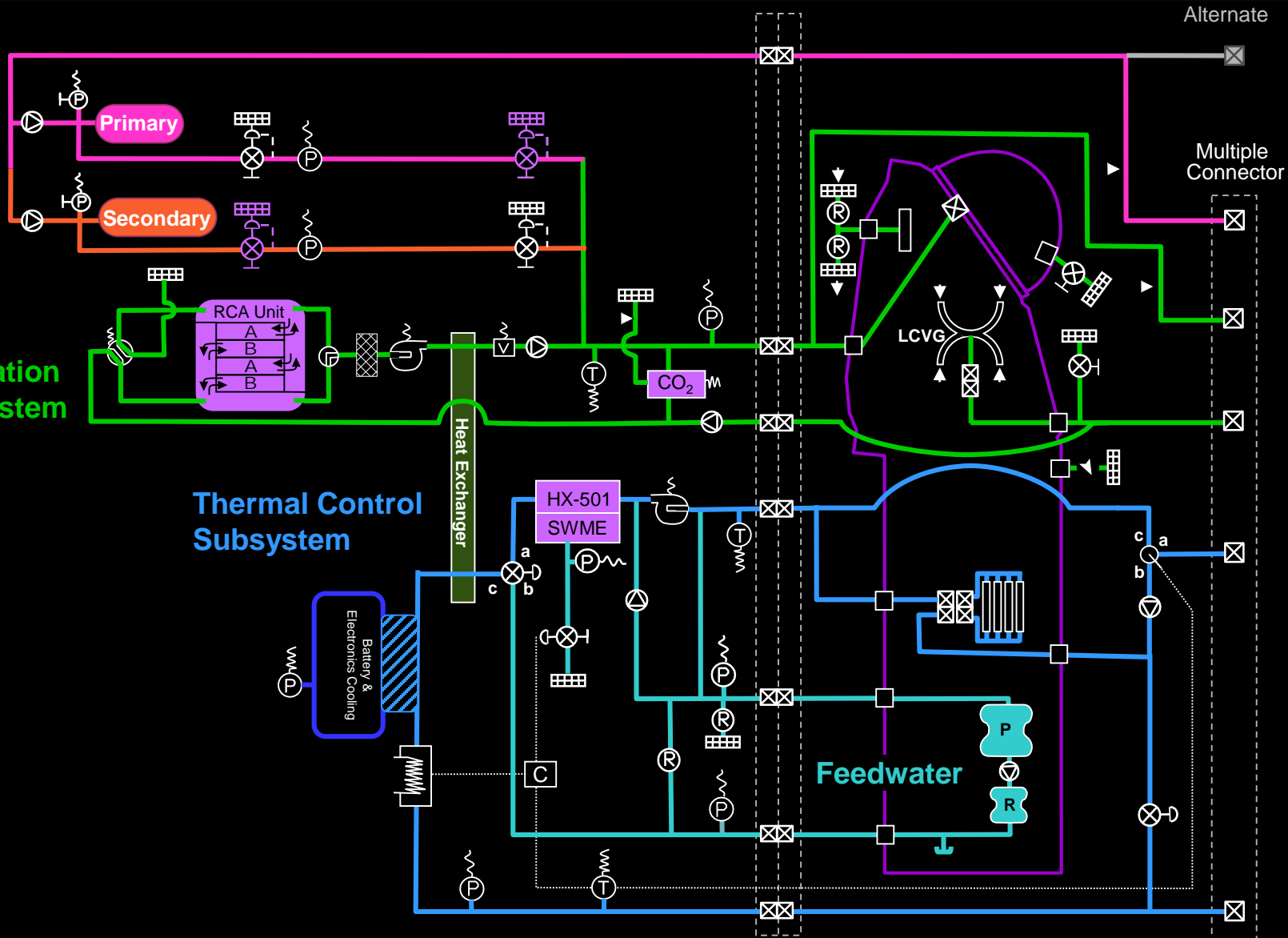
Thermal

- ☒ Nominal
- ☒ Recharge
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- ☒ Emergency
- ☒ Buddy

Oxygen Subsystem

Ventilation Subsystem

Thermal Control Subsystem





Oxygen

- Nominal
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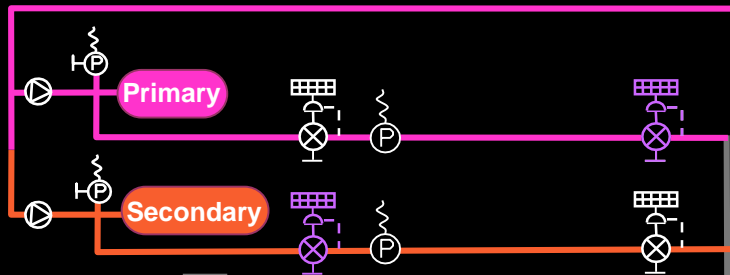
Ventilation

- Nominal
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- Buddy

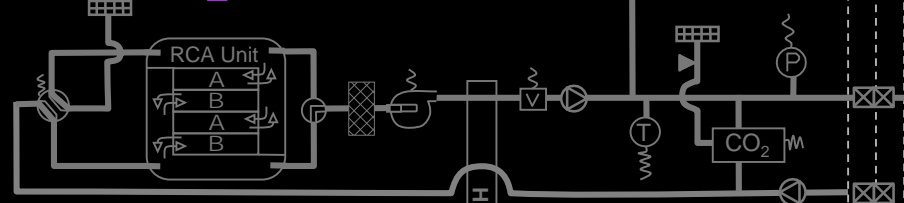
Thermal

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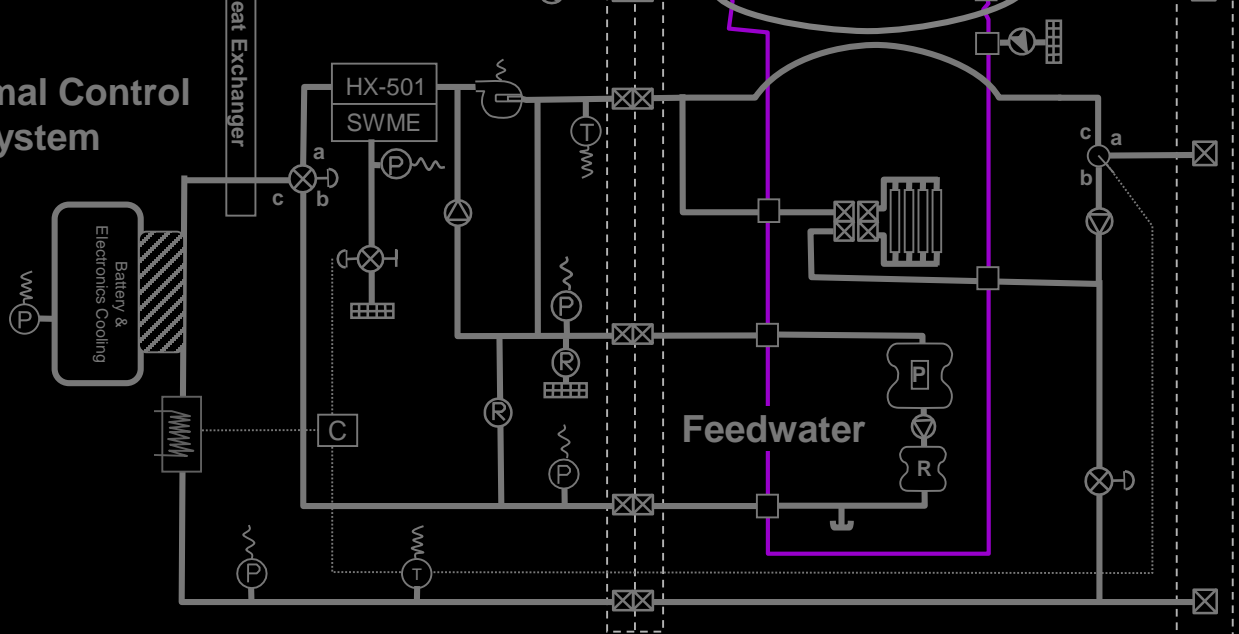
Oxygen Subsystem



Ventilation Subsystem



Thermal Control Subsystem



Alternate

Multiple Connector

PLSS

Portable Life Support System

Click to Activate

Oxygen

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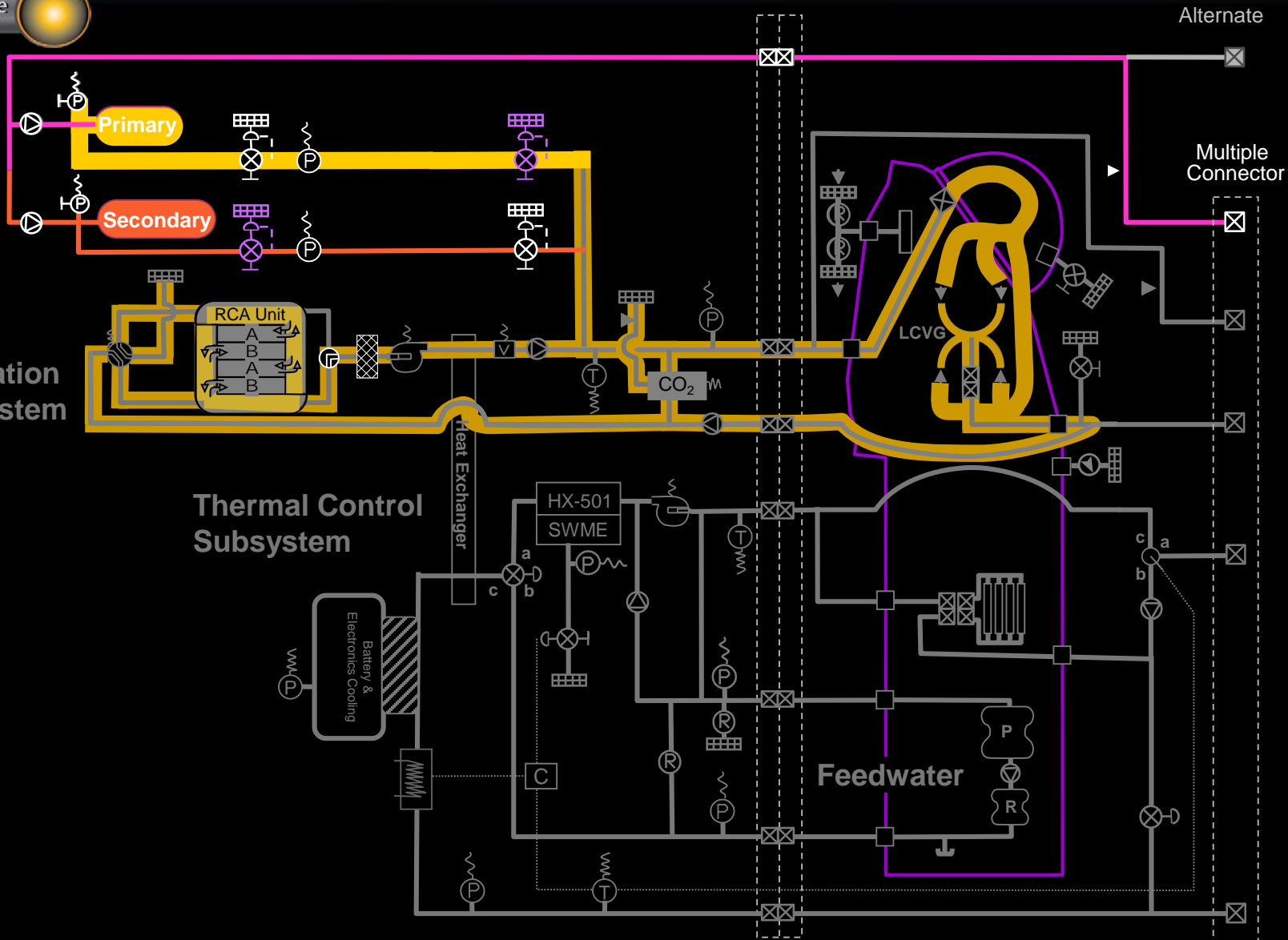
Thermal

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Oxygen Subsystem

Ventilation Subsystem

Thermal Control Subsystem



PLSS

Portable Life Support System

Click to Activate

Oxygen

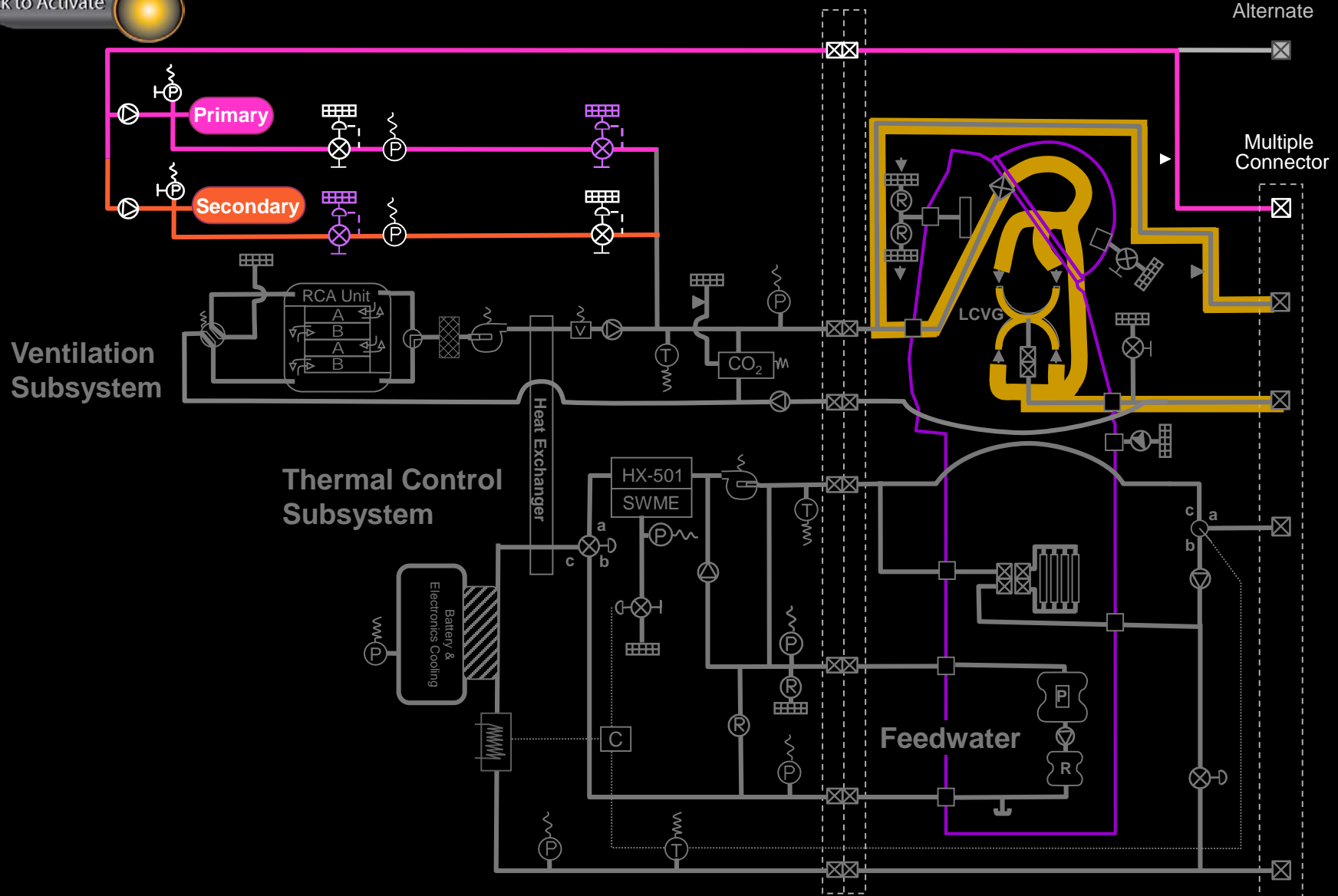
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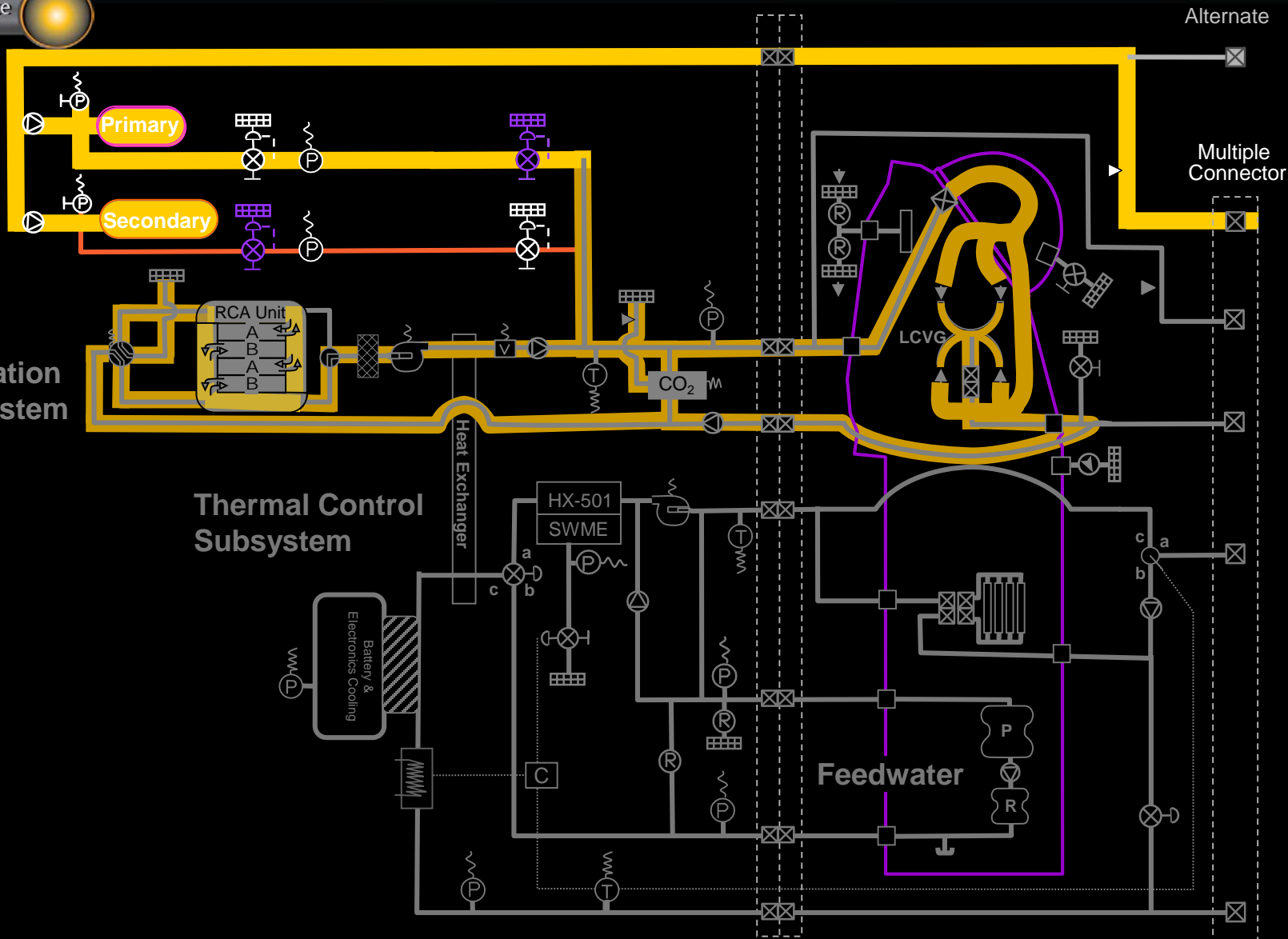
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Ventilation Subsystem

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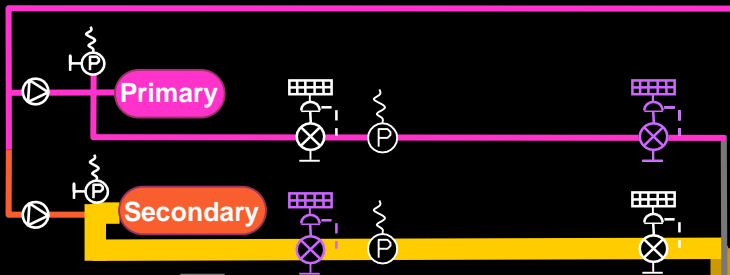
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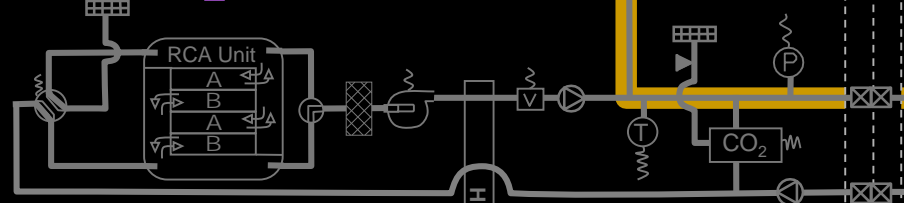
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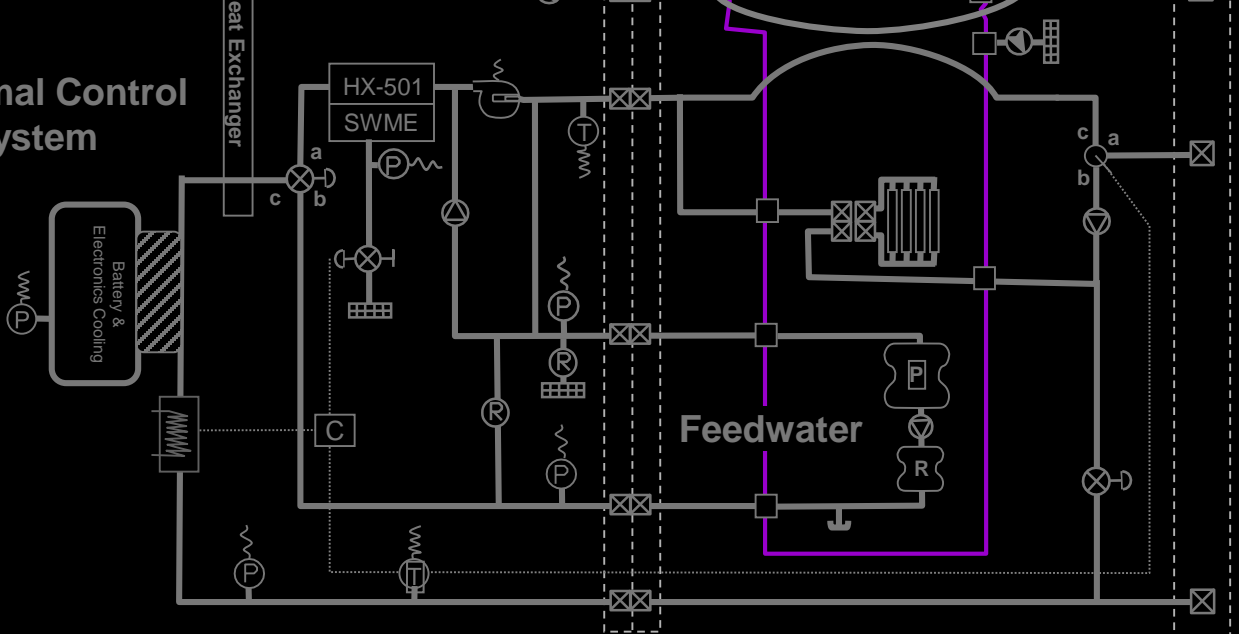
Oxygen Subsystem



Ventilation Subsystem



Thermal Control Subsystem



Alternate

Multiple Connector



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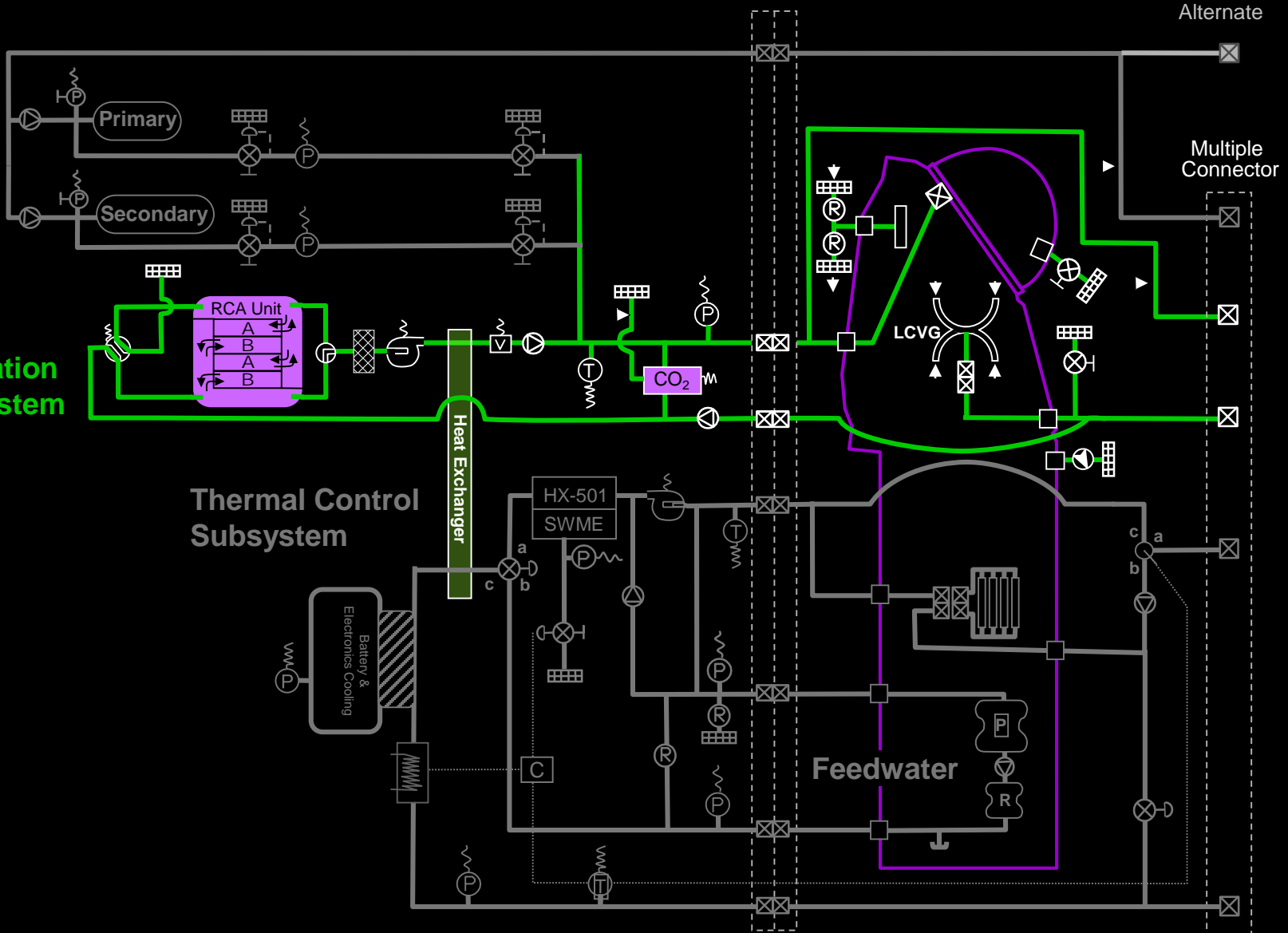
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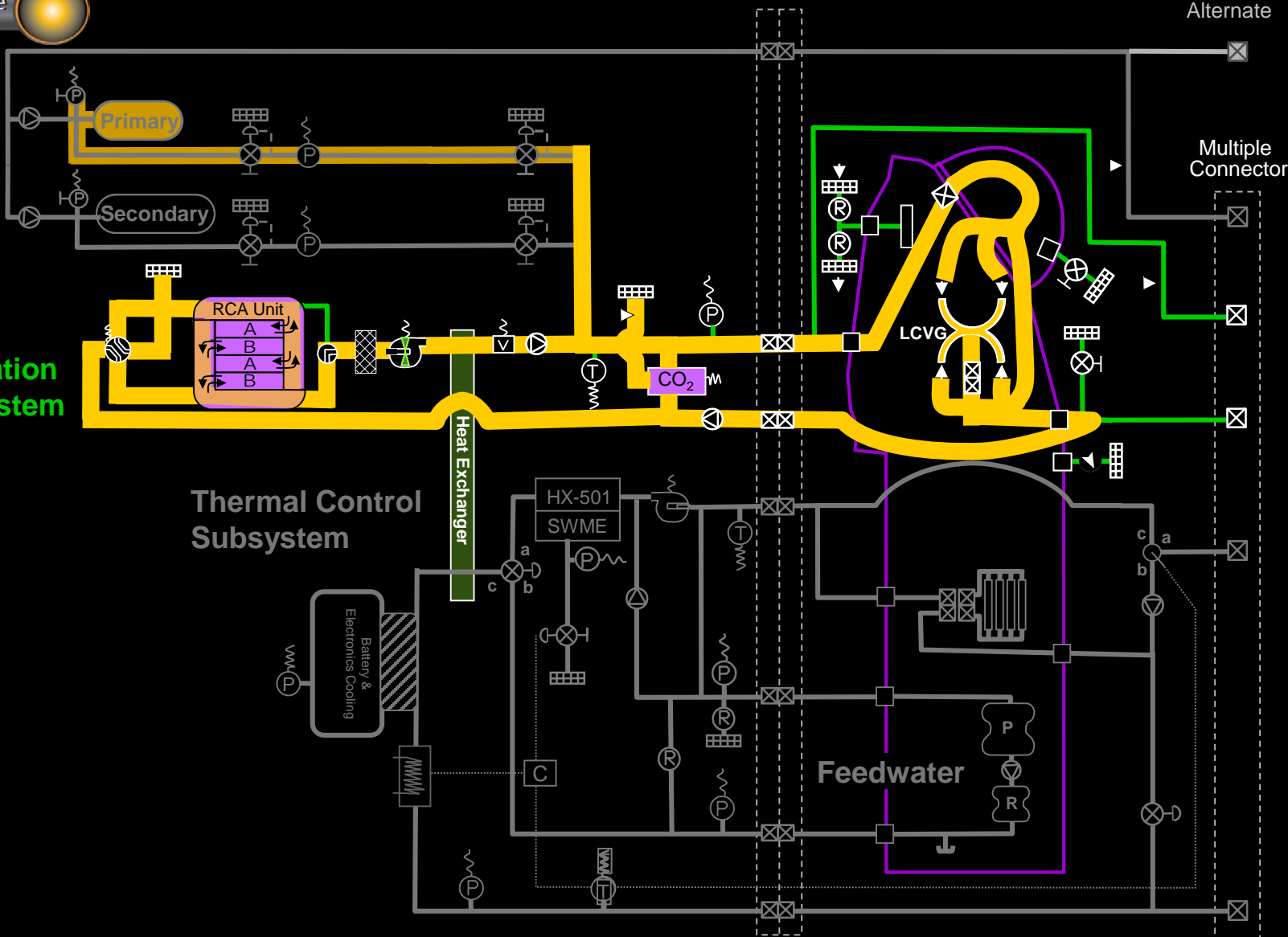
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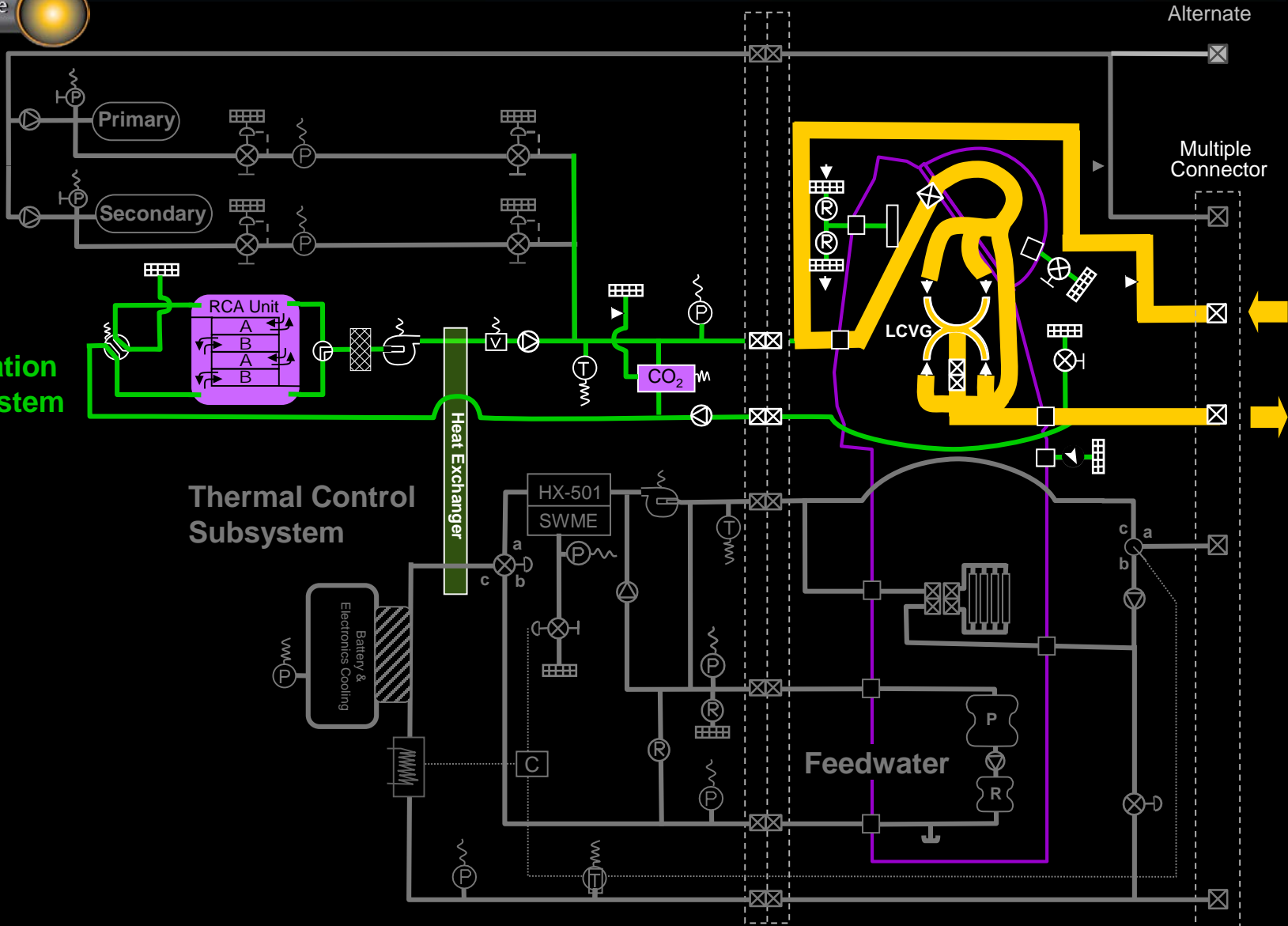
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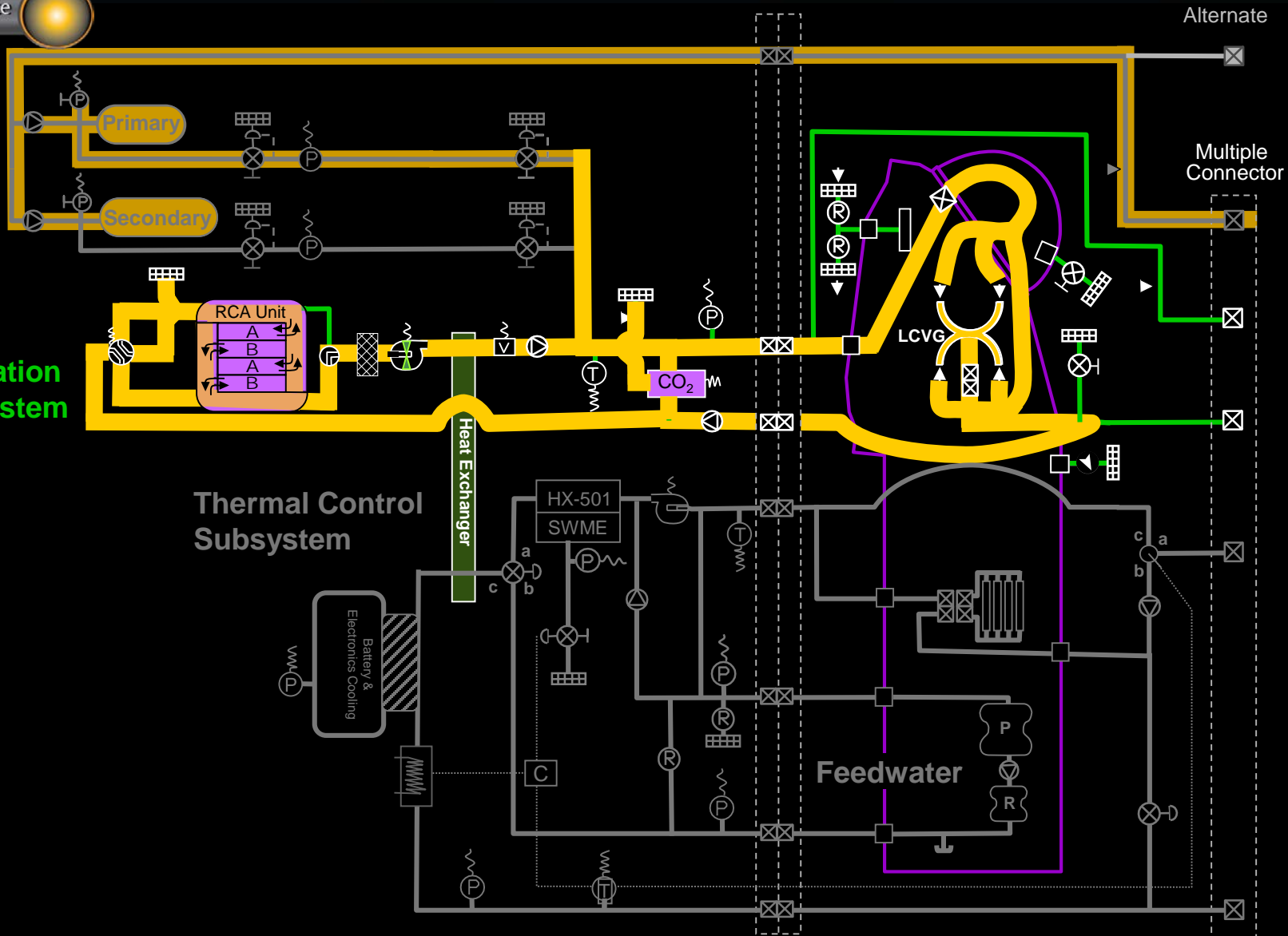
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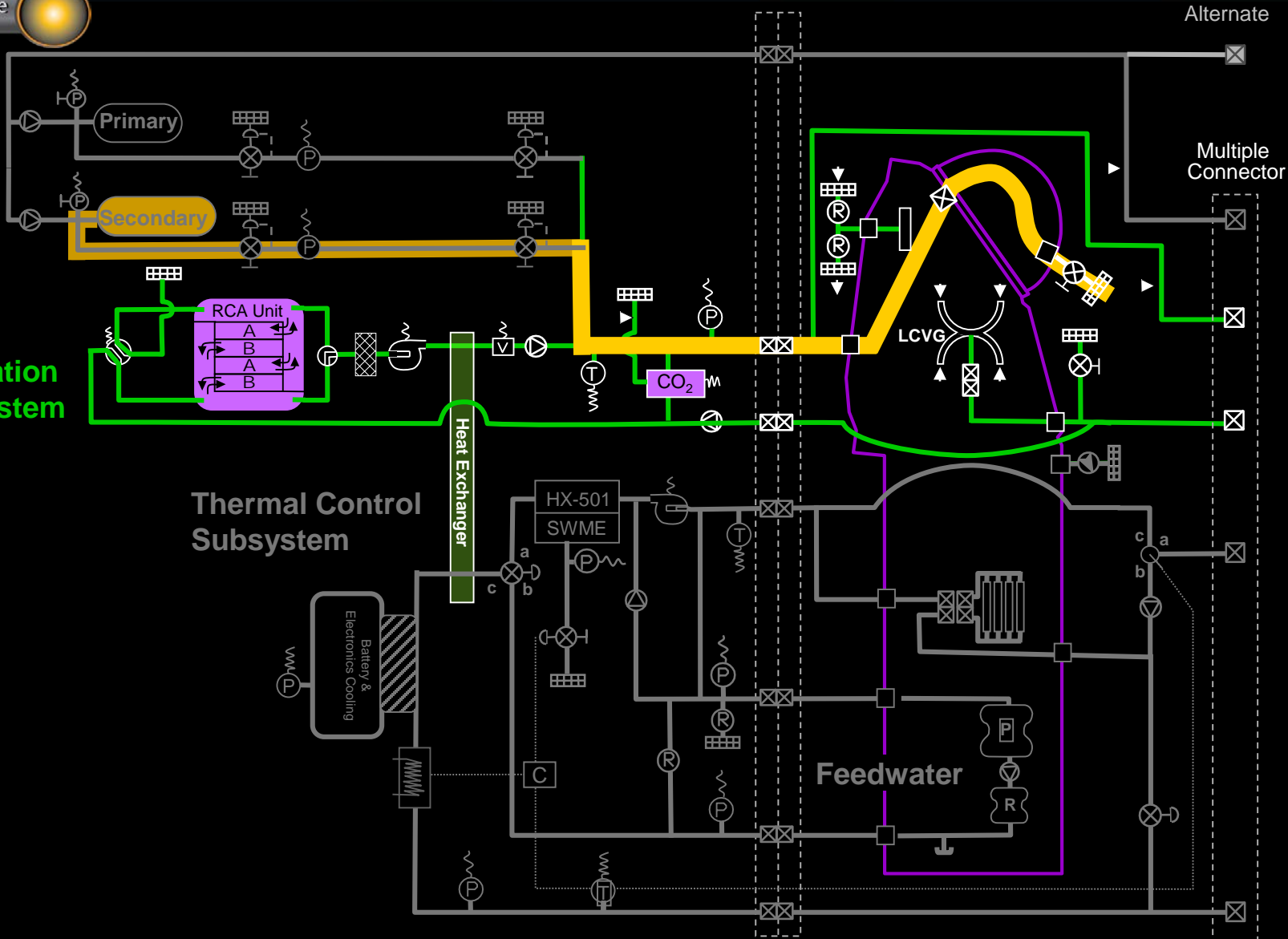
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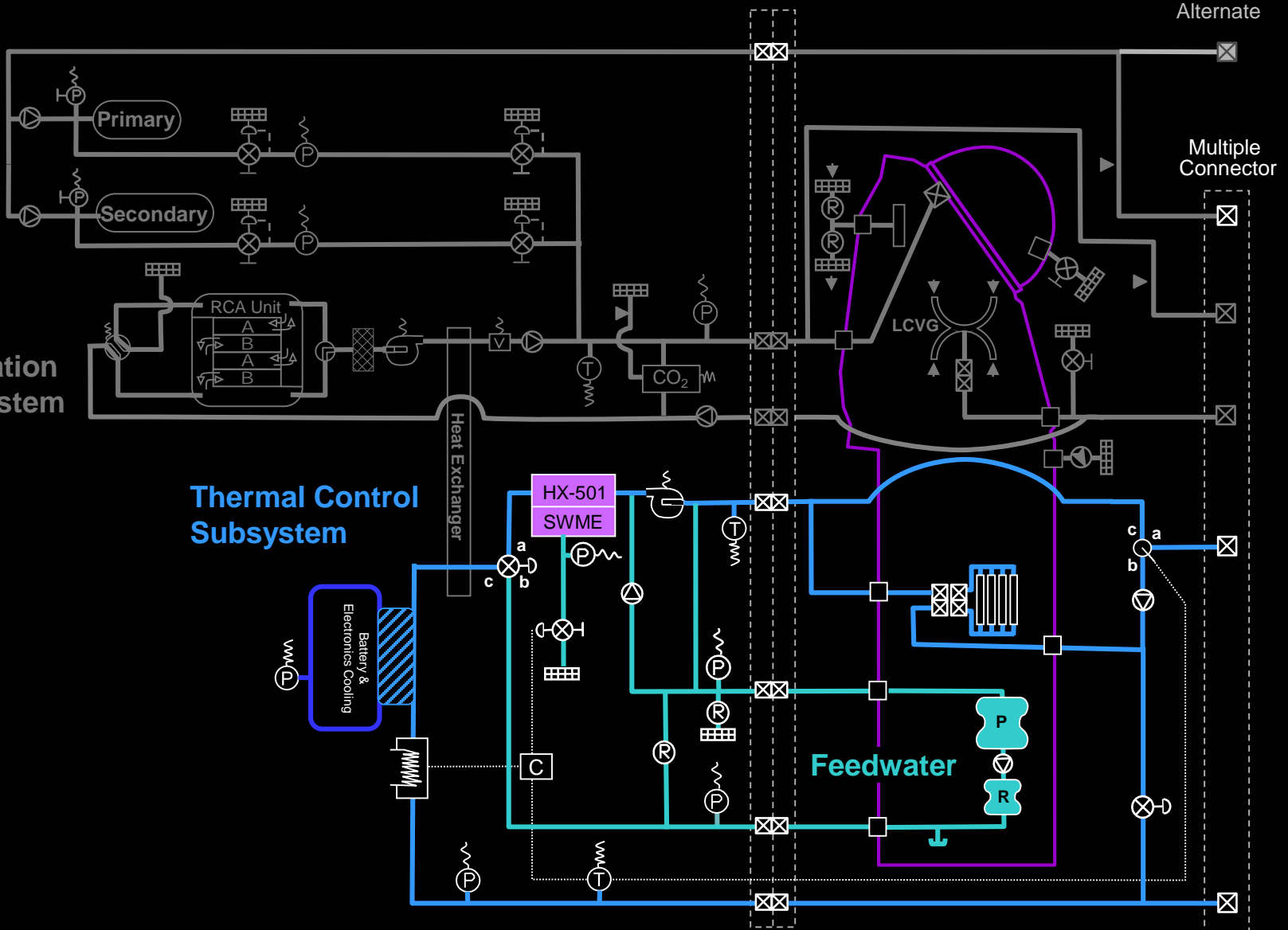
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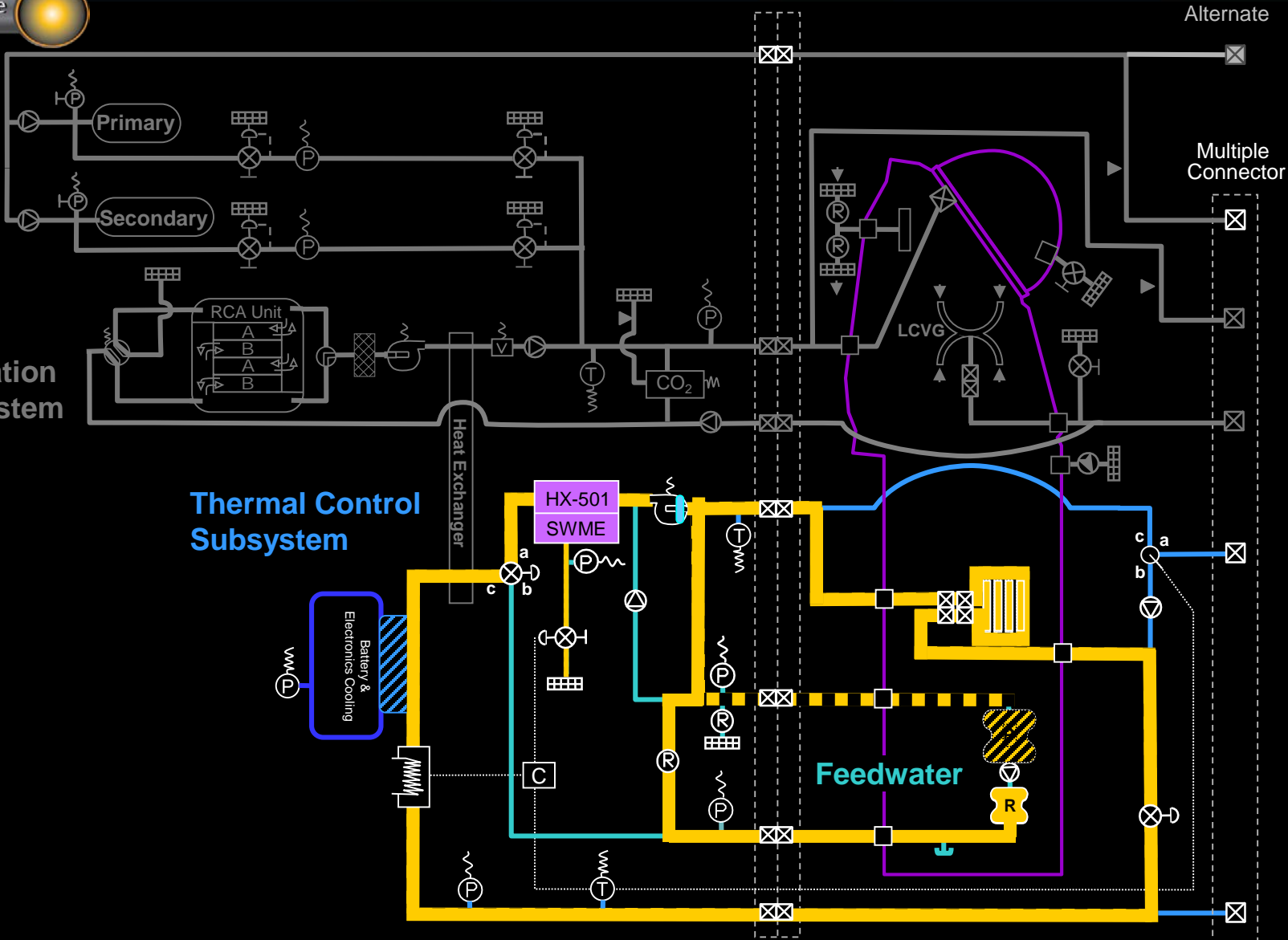
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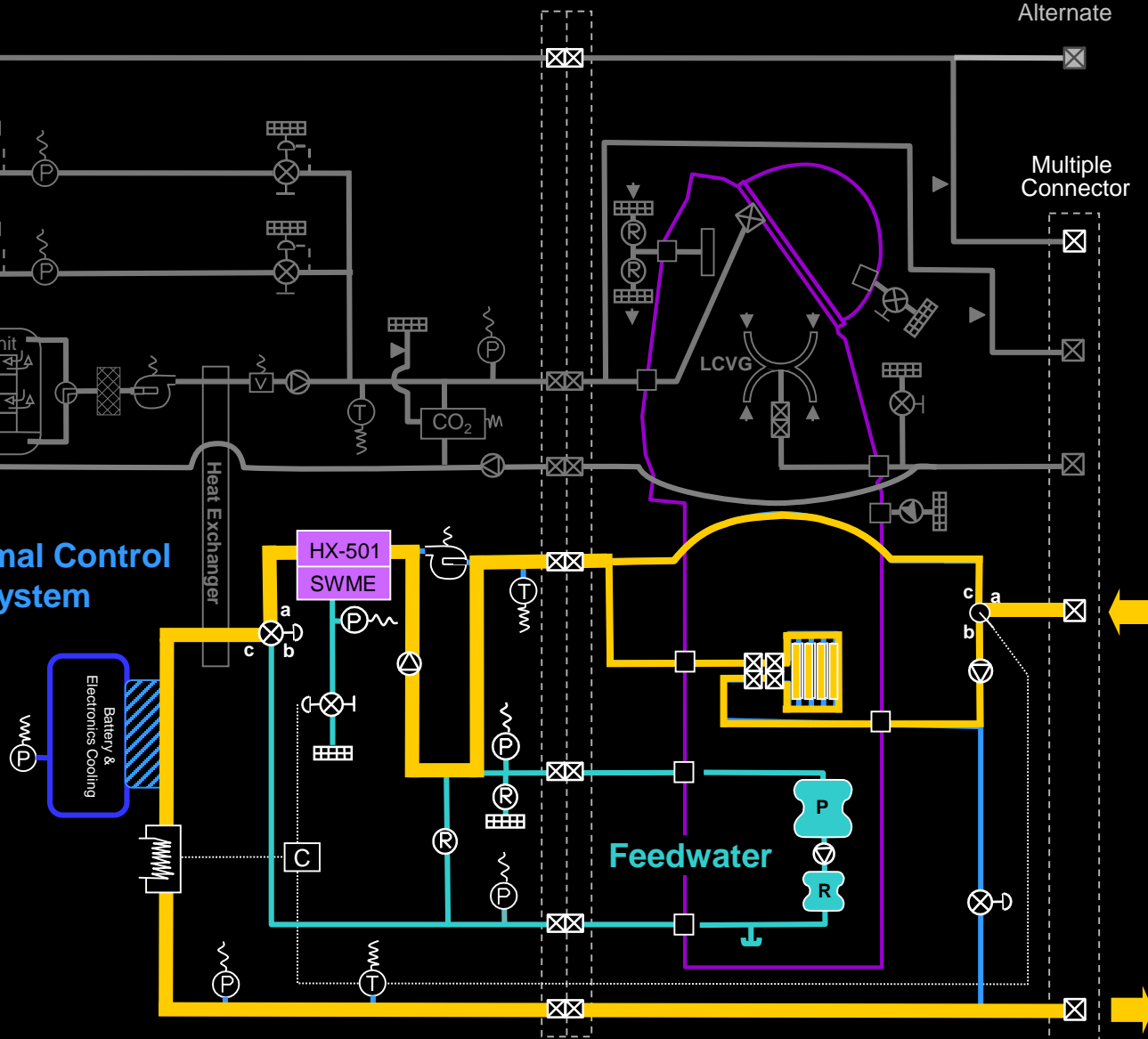
Oxygen Subsystem

Ventilation Subsystem

Thermal Control Subsystem

Alternate

Multiple Connector



PLSS

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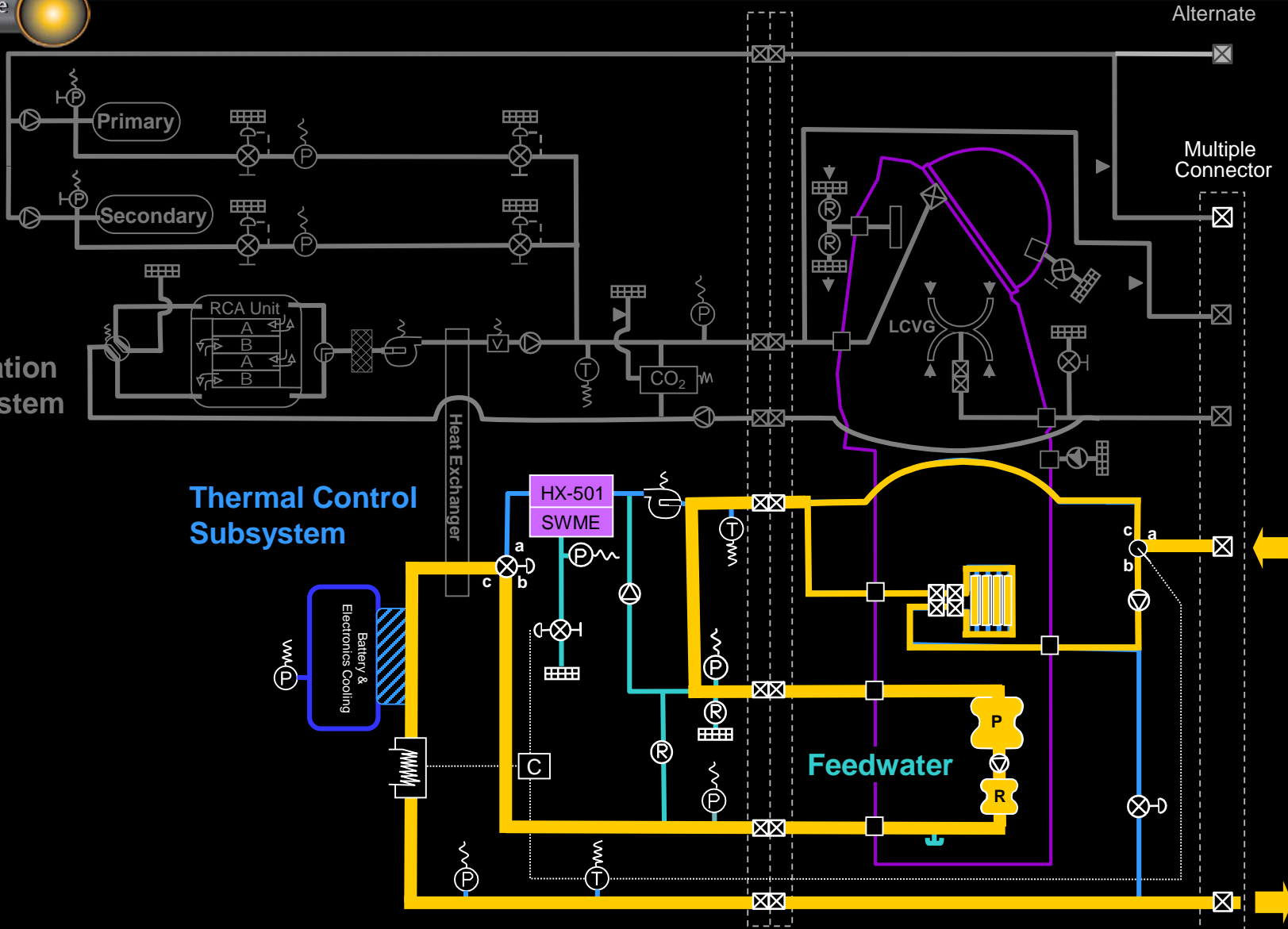
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Oxygen Subsystem

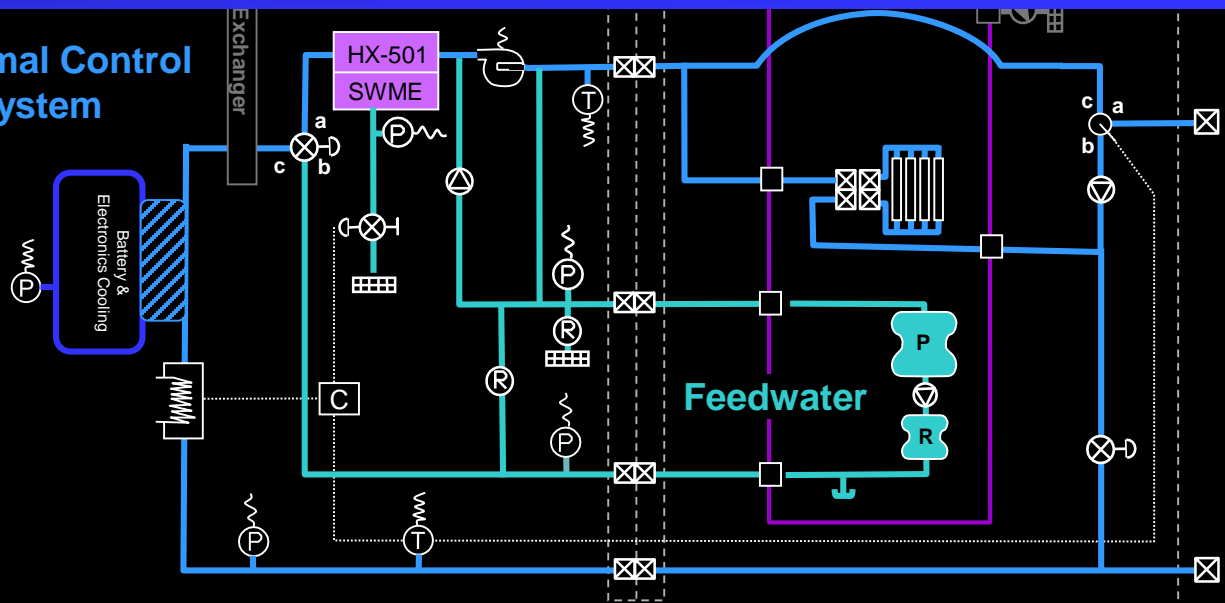
Ventilation

Alternate

Multiple Connector

No active thermal waterloop flow paths during emergency mode

Thermal Control Subsystem



PLSS

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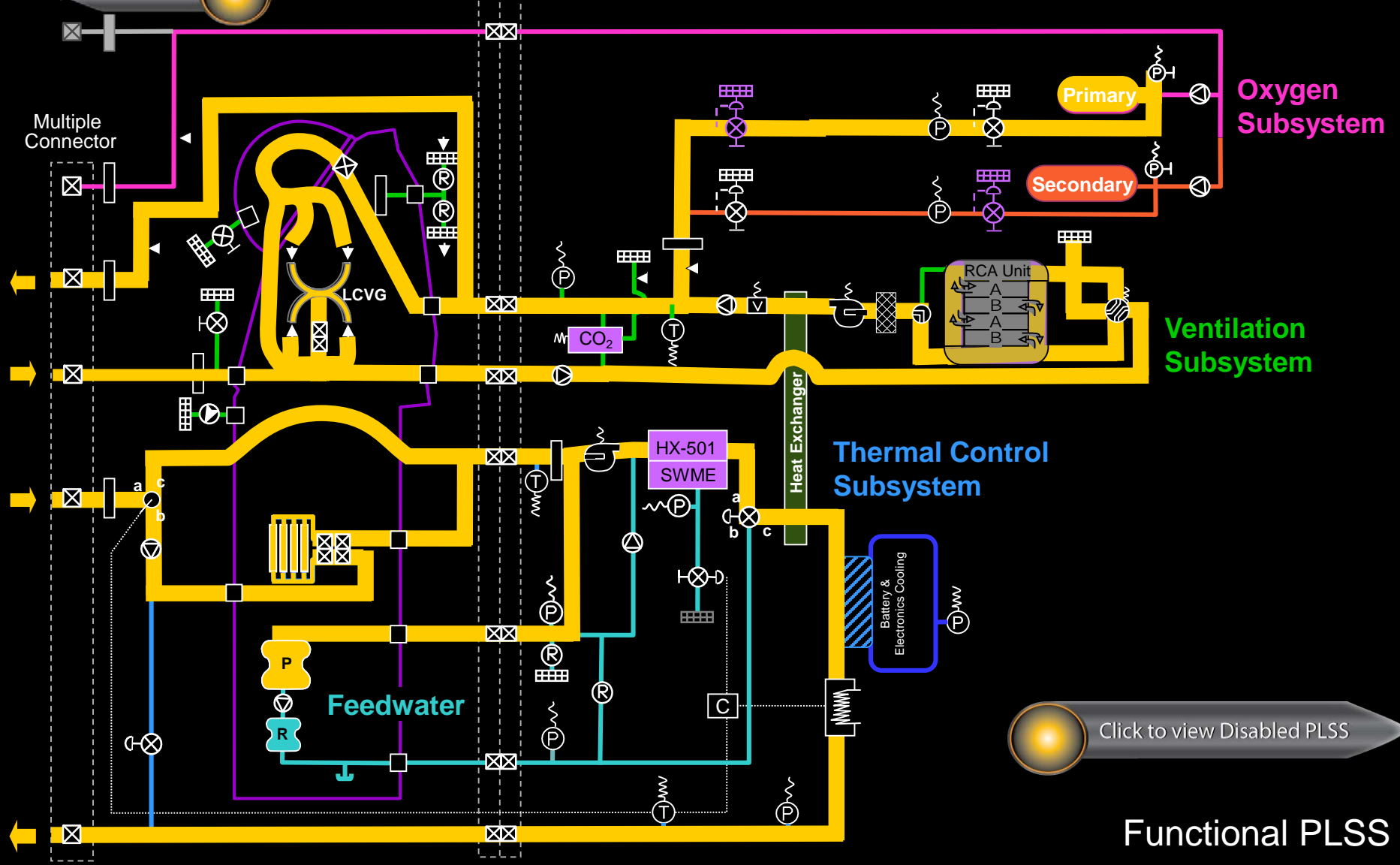
Ventilation

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Thermal

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Click to Activate



Click to view Disabled PLSS

Functional PLSS

PLSS

Portable Life Support System

Click to Activate

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- Buddy

Ventilation

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Thermal

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Oxygen Subsystem

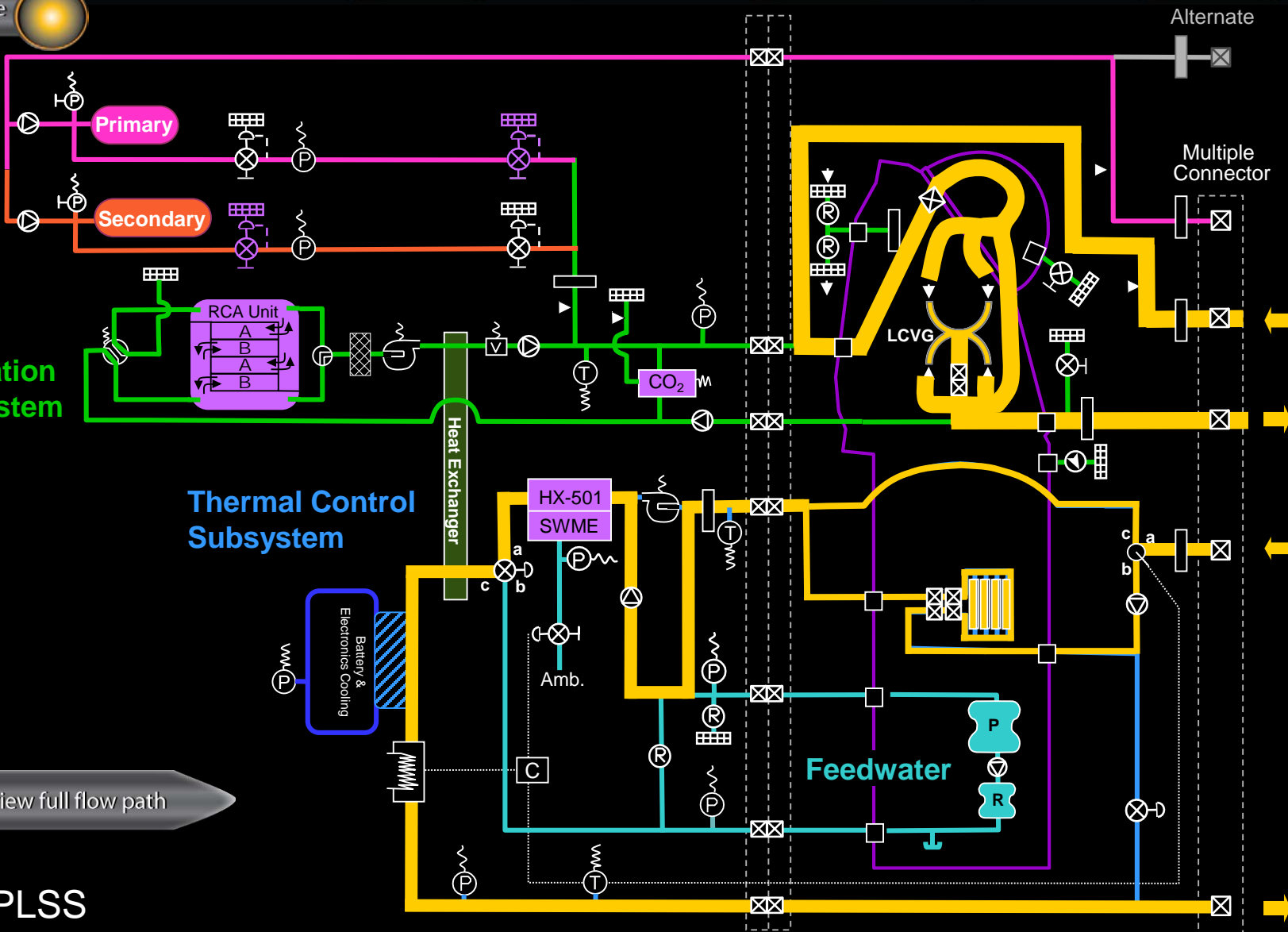
Ventilation Subsystem

Thermal Control Subsystem

Feedwater

Disabled PLSS

Click to view full flow path





Click to Activate

Oxygen

- Nominal
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Ventilation

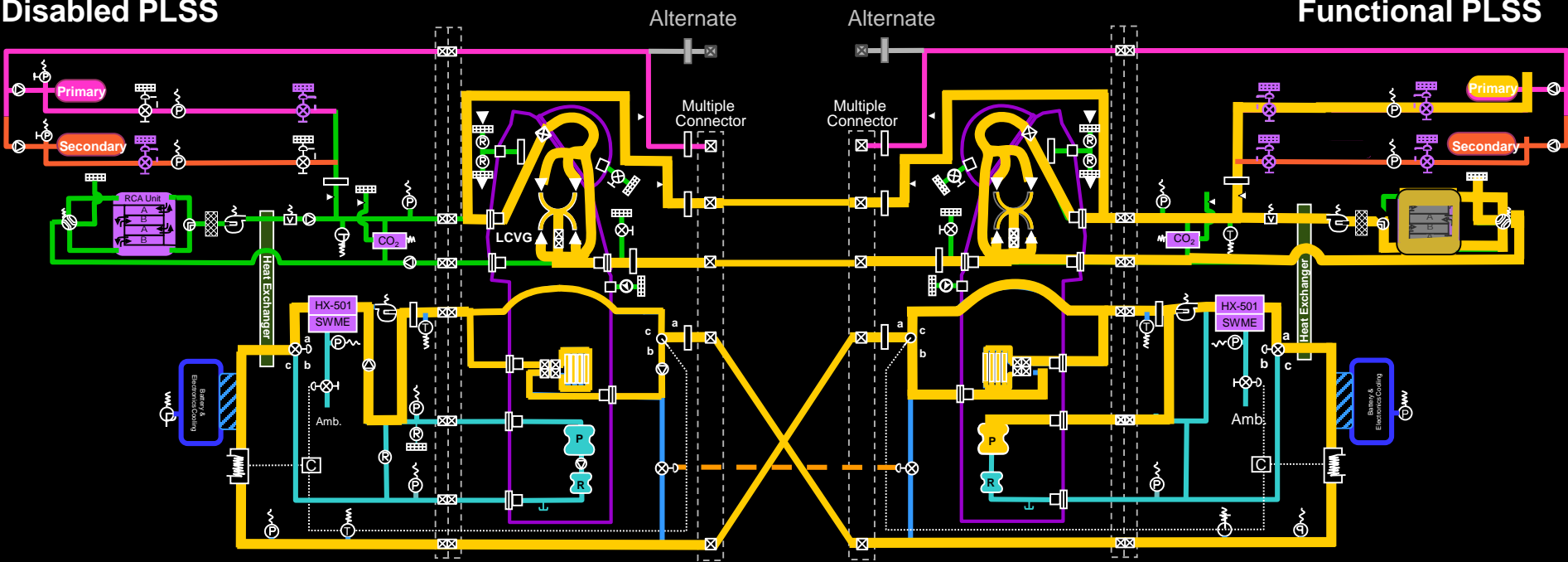
- Nominal
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Thermal

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Disabled PLSS

Functional PLSS





Click to Activate



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Ventilation

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CO₂ Sensor

Ventilation to suit

Monitor Ventilation To Suit

Regenerate Silica Gel

Silica Gel
(Humidity Trap)

Digital Read-out

2.66 mm Hg

Detector

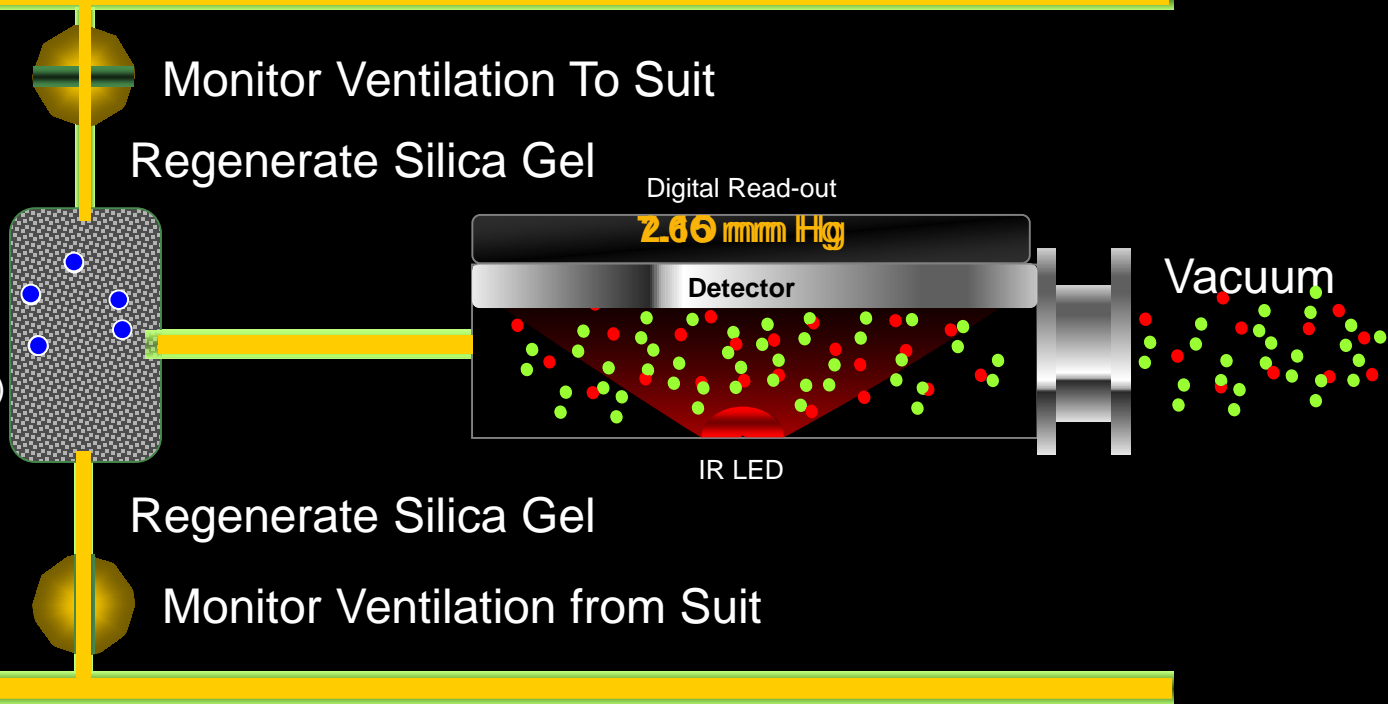
IR LED

Vacuum

Regenerate Silica Gel

Monitor Ventilation from Suit

Ventilation from suit





Click to Activate



Oxygen

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Ventilation

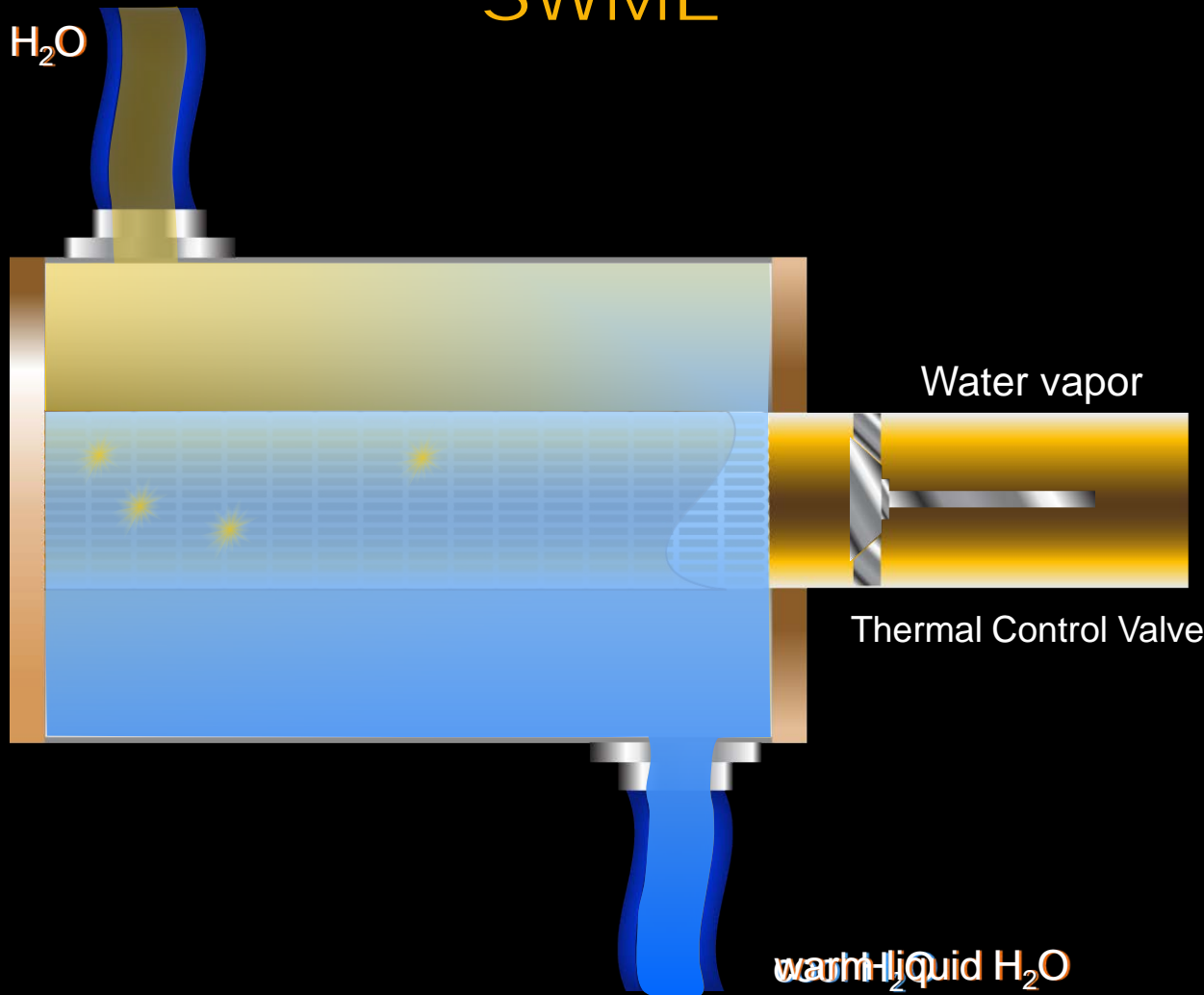
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Thermal

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SWME

warm liquid H_2O
From suit



Water vapor

Vacuum

Thermal Control Valve

warm liquid H_2O
To suit



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RCA

